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# DIY Kit 105. 18W BTL AUDIO POWER AMPLIFIER

## INTRODUCTION

This kit contains the essential components to build a low voltage, high power mono 18W Bridge Tied Load (BTL) amplifier module using the Hitachi HA13118. The circuit is straight out of the data sheet. Only a few external passive components are required to make the module. The IC contains surge protection circuits and thermal shutdown circuits.

The speaker and cables are not included. This is not only to save weight in the kit but also because such items are often a matter of personal preference by the user. Some users may choose to spend more money to buy top quality cables, connectors and speakers, while others may have all these items already in their junk box. A heatsink with a thermal resistance of 3 °C/W is provided.

The kit is constructed on single-sided printed circuit board. Protel Autotrax & Schematic were used in the design.

## CONSTRUCTION

Start with the resistors followed by the capacitors. Be careful to get the electrolytic capacitors in the correct way around. The positive lead is marked on the overlay. The negative lead is marked on the body of each capacitor.

The following items have to be supplied by you:

- 3, 4 or 8 ohm speaker.
- suitable cables.

Solder the power and audio cables directly to the pads provided on the PCB.

## OPERATION

As in all amplifier modules the output power varies with the supply voltage and speaker resistance. In this module the highest output of 18W is achieved at 13.2V into a 4 Ω speaker.

The amplifier IC uses a Bridge Tied Load (BTL) configuration to connect the load. This means that the outputs are floating with respect to the negative supply rail (or ground). **Therefore the outputs of the amplifier should never be connected to ground.**

**Do not operate the module without a heatsink.**

**Note:** C11 protects the module from induced RF pickup, particularly if the inputs leads are long. As the input frequency increases the capacitor impedance decreases. Eg. 160KΩ @ 1kHz, 16KΩ @ 10kHz, 8KΩ @ 20kHz. Obviously this will have some effect on the overall input impedance of the module. However when the module is driven by a low impedance output, such as a preamplifier or speaker jack, the effect will be minimal.

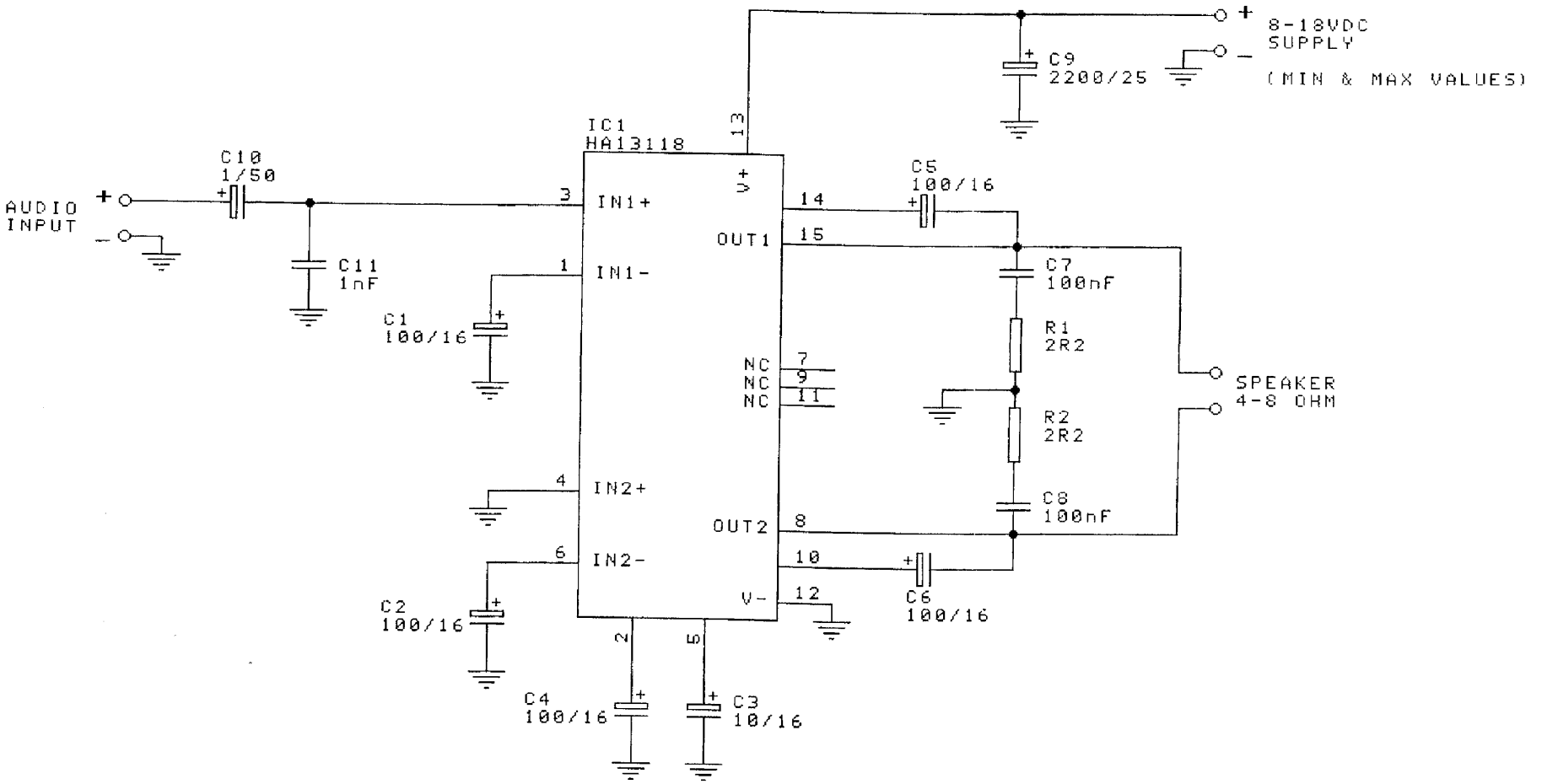
**HA13118 SPECIFICATIONS**

(13.2V supply, Frequency = 1kHz, Load = 4 Ω)

| | |
|---|---|
| Output power | 18W (THD = 10%) |
| | 14W (THD = 1%) |
| Input resistance | 20 - 40kΩ |
| Frequency response | 50Hz - 20kHz (-3dB) |
| | 20Hz - 40kHz (-6dB) |
| Current @ 18W | 2.5A (approx) |
| Operating voltage | 8 - 18V |
| Board dimensions | 55 x 27mm |
| | 2.2 x 1.1in |

**PARTS LIST - KIT 91**

| | | |
|---|---|---|
| **Resistors** | | |
| 2R2 1/4W carbon | R1,2 | 2 |
| **Capacitors** | | |
| 1nF mylar | C11 | 1 |
| 100nF box polyester film | C7,8 | 2 |
| 1uF 50V electrolytic | C10 | 1 |
| 10uF 16V electrolytic | C3 | 1 |
| 100uF 16V electrolytic | C1,2,4,5,6 | 5 |
| 2200uF 25V electrolytic | C9 | 1 |
| **Semiconductors** | | |
| HA13118 | IC1 | 1 |
| 18W BTL Audio Power Amplifier | | |
| **Miscellaneous** | | |
| PCB, K105 | | 1 |
| HS215 heatsink | | 1 |


IC1
HA13118
AUDIO
INPUT
C10
1/50
C11
1nF
C1
100/16
C2
100/16
C4
100/16
C3
10/16
C9
2200/25
8-18VDC
SUPPLY
(MIN & MAX VALUES)
C5
100/16
C6
100/16
C7
100nF
C8
100nF
R1
2R2
R2
2R2
SPEAKER
4-8 OHM
IN1+
IN1-
IN2+
IN2-
V+
V-
OUT1
OUT2
NC
NC
NC
3
1
4
6
2
5
13
14
15
7
9
11
8
10
12